PROC. ENTOMOL. SOC. WASH.
82(4), 1980, pp. 568–575

BRACHYNOTOCORIS HEIDEMANNI (KNIGHT), A JUNIOR SYNONYM OF THE PALEARCTIC *B. PUNCTICORNIS* REUTER AND PEST OF EUROPEAN ASH

A. G. Wheeler, Jr. and Thomas J. Henry

Bureau of Plant Industry, Pennsylvania Department of Agriculture, Harrisburg, Pennsylvania 17110.

Abstract.—The orthotyline mirid *Brachynotocoris heidemanni* (Knight), described from the Washington, D.C. area as *Orthotylus delicatus* by Heidemann in 1892 and renamed *O. heidemanni* by Knight owing to homonymy, is established as a junior synonym of the Palearctic *B. puncticornis* Reuter. This mirid is considered to have been introduced with imported European ash (*Fraxinus excelsior* L.), the only known host. Damage to foliage of the host is described and a diagnosis of the adult is provided. The adult habitus, male genitalia, and egg are illustrated.

In August 1979 the senior author collected a species of the mirid genus *Brachynotocoris* Reuter on the Cornell University campus, Ithaca, N.Y. Since we were aware of *B. heidemanni* Knight as the only North American representative of this otherwise Palearctic genus, we compared our specimens to type-material of this species from Washington, D.C. Our specimens were conspecific with those from Knight's type-series, but we were puzzled because the mirid at Ithaca was confined to European ash, *Fraxinus excelsior* L., even though native ash trees were growing nearby. Our suspicion that we might be dealing with a Palearctic species was confirmed after we compared our material with the European *B. puncticornis* Reuter, a species that breeds on *F. excelsior*. Study of specimens borrowed from the British Museum (Natural History) allowed us to establish Knight's species as a junior synonym of *B. puncticornis*.

Taxonomic History

Brachynotocoris puncticornis Reuter (1880) was described from Spain and was the only included species in the genus. Wagner (1973), in characterizing *B. puncticornis* as a Mediterranean species, noted that the records he had recognized from northern Africa (Wagner, 1956) were based on misidenti-

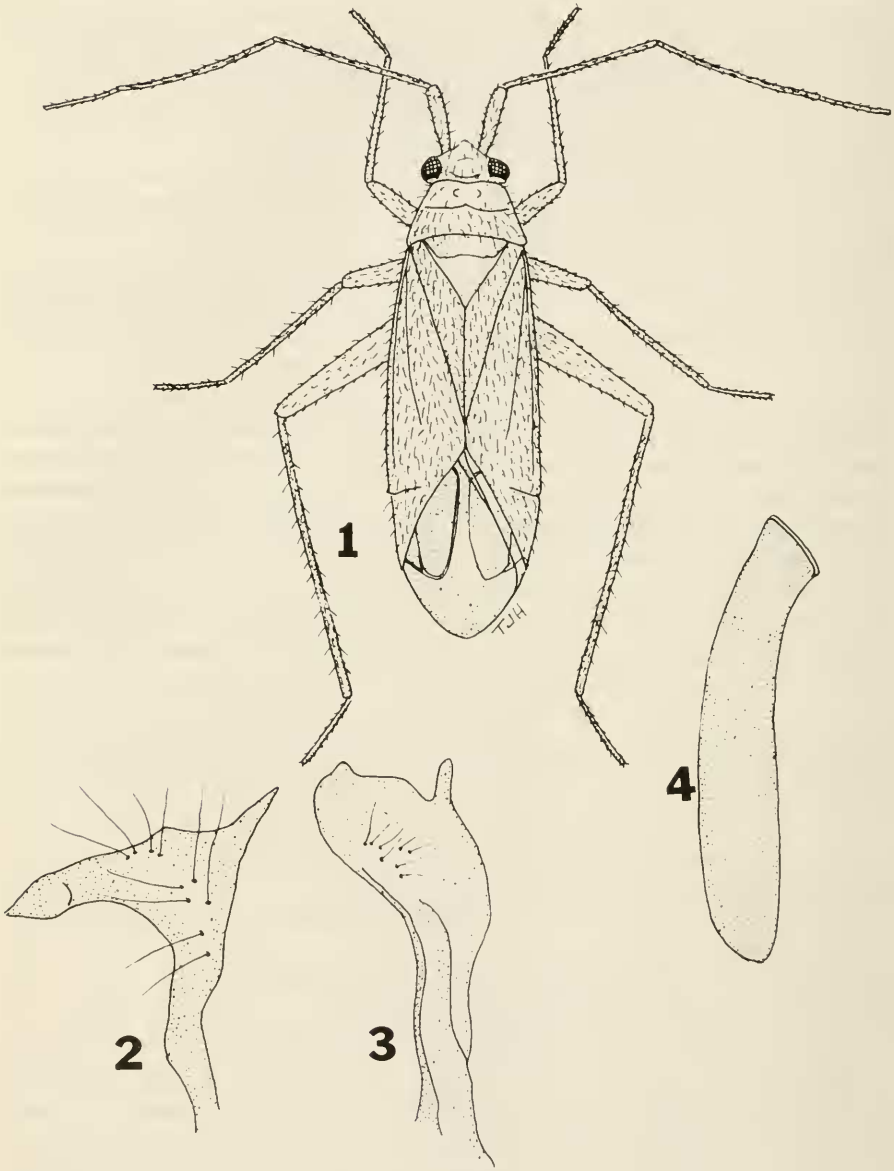
fications of other species of *Brachynotocoris*. The known distribution of *puncticornis* (in addition to Spain) includes France, Germany, Portugal, Sicily, and the European USSR (Carvalho, 1958; Kerzhner, 1967). *F. excelsior* is the only known host; the record from *F. oxyphylla* Marsh. (Bergevin, 1924) apparently refers to *B. parvinotum* (Lindberg).

In North America Heidemann (1892) unintentionally validated the Uhler manuscript name *Orthotylus delicatus* for a species he found on European ash in Washington, D.C. (Wheeler and Henry, 1975). Knight (1927) described the new species *Diaphnidia heidemanni* based on Heidemann's Washington material from ash and specimens from nearby Prince Georges County, Maryland. Knight may have credited Heidemann with validating Uhler's manuscript name, realized that this name was preoccupied by *O. (Psallus) delicatus* Cook (1891), and then proposed *heidemanni* as a replacement name. Or Knight may have considered Heidemann's brief notes insufficient to validate the Uhler name and thus described *heidemanni* as a new species. He did not explain his actions, but regardless of his opinion, *D. heidemanni* was the valid name for the mirid occurring on European ash in the Washington vicinity (Wheeler and Henry, 1975). Kelton (1961) transferred *heidemanni* to *Brachynotocoris*, thus recognizing for the first time this Old World genus from the Nearctic Region. Kelton acknowledged the similarity of Knight's species to *B. puncticornis* but maintained the two as distinct. He apparently based that decision on Seidenstücker's (1954) illustration of male genitalia and other characters of *puncticornis* rather than on examination of Palearctic material. We now consider *B. heidemanni* a junior synonym of *B. puncticornis* and propose the following synonymy.

Brachynotocoris puncticornis Reuter

Brachynotocoris puncticornis Reuter, 1880: 23.
Orthotylus delicatus Heidemann, 1892: 226 (preoccupied by *Orthotylus delicatus* Cook, 1891).
Diaphnidia heidemanni Knight, 1927: 13. NEW SYNONYMY.
Brachynotocoris heidemanni: Kelton, 1961: 566.
Labopidea utahensis Knight, 1968: 97 (synonymized by Kelton, 1979).

Male (Fig. 1).—Length 4.32–4.76 mm, $\bar{x}$ = 4.50, n = 5, width 1.34 mm, generally yellowish green with clavus, corium, embolium, cuneus, and membranal veins darker green, clothed with pale, recumbent simple setae; legs and antennae yellowish green, antennal segments III and IV more dusky. *Head:* Width 0.86 mm, vertex 0.34 mm. *Rostrum:* Length 0.84 mm, nearly reaching middle of mesosternum. *Antennae:* I, length 0.54 mm; II, 1.44–1.56 mm, $\bar{x}$ = 1.50 mm, n = 5; III, 1.54–1.70 mm, $\bar{x}$ = 1.63 mm, n = 5; IV, 0.62 mm. *Pronotum:* Length 0.42 mm, basal width 1.04 mm. *Genital Parameres:* (Figs. 2—3).



Figs. 1–4. *Brachynotocoris heidemanni*. 1, Adult male. 2, Left paramere. 3, Right paramere. 4, Egg.

Female.—Length 4.28–4.56 mm, $\bar{x}$ = 4.40 mm, n = 5, width 1.34 mm. *Head:* Width 0.80 mm, vertex 0.38 mm. *Rostrum:* Length 0.88 mm. *Antennae:* I, Length 0.58 mm; II, 1.34–1.44 mm, $\bar{x}$ = 1.38 mm, n = 5; III, 1.48–1.60 mm, $\bar{x}$ = 1.52 mm, n = 5; IV, 0.68 mm. *Pronotum:* Length 0.40 mm, basal width 1.00 mm.

Egg (Fig. 4).—Length 1.00–1.04 mm, $\bar{x}$ = 1.02 mm, n = 5; width 0.16–0.20 mm, $\bar{x}$ = 0.18 mm, n = 5. Slender, pale translucent with a narrow cap at curved apex.

Remarks.—*Brachynotocoris puncticornis* is separated from all other small green Orthotylinae in the eastern United States by having the third antennal segment longer than the second segment and a very short rostrum which does not reach the mesocoxae. *Brachynotocoris* will key to couplet 9 in Knight (1941), going to either *Orthotylus* Fieber (couplet 10) or *Mecomma* Fieber and *Cyrtorhinus* Fieber (couplet 11). Kelton (1961) provided a key for separating this genus from *Diaphnidia* Uhler and *Diaphnocoris* Kelton, and Henry (1977) gave a key to separate all green orthotyline mirids occurring in eastern North America, including *Brachynotocoris*.

Biological Notes

During 22–23 August 1979, 9♂ and 34♀ of *B. puncticornis* were collected from a population estimated at several thousand on a single European ash (about 20 cm dbh, 10 m high). In Europe this mirid is considered univoltine with adults present from July[1] until September (Wagner, 1973). At Ithaca only adults were found, and the preponderance of females may have indicated that peak adult emergence was past and that most of the males already had died. Other green orthotyline mirids may occur in large numbers on shade trees, e.g. *Diaphnocoris chlorionis* (Say) on honeylocust (Wheeler and Henry, 1976).

Nearly all leaves of the host tree showed chlorotic spots on the upper leaf surfaces (Fig. 5). Native ash-feeding mirids of the genus *Tropidosteptes* Reuter produce similar symptoms, but the chlorotic areas are not usually so evenly distributed over the leaflets. Since *B. puncticornis* was not found on native ash trees, even though a large green ash was growing within 30-35 m, this mirid may be a pest only of European ash.

In Europe *B. puncticornis* is known to overwinter in the egg stage (Wagner, 1956), and at Ithaca eggs had been laid by late August. They were inserted in lenticels of current-season twigs. With a relatively loose arrange-

[1] Heidemann (1892) noted that he took adults at Washington from mid-June to July. Knight's (1927) type-series of *D. heidemanni* was said to include Heidemann's specimens collected from May 7 to Oct. 15. We believe that the early and late records were based on misidentification of some similar green orthotyline mirid or on misinterpretation of label data.

Fig. 5. Leaf of European ash showing injury (chlorotic areas) by *Brachynotocoris heidemanni*.

ment of cells, lenticels would seem to offer convenient oviposition sites. On apple, several mirid species are known to insert their eggs in or at the edge of lenticels (Sanford, 1964).

In 1980 we confirmed that *B. puncticornis* is a rather late-appearing, univoltine species; eggs hatched about the first week of July. On 20 July a few teneral adults were present with large numbers of fourth- and fifth-instars.

Discussion

Of the more than 70 heteropteran species known both from the northeastern United States and the Palearctic Region, relatively few have been documented as artifically introduced with commerce (Slater, 1974). Available evidence suggests that *B. puncticornis* has been introduced to North America with imported nursery stock. Its distribution, Washington, D.C. and a neighboring county in Md., plus Ithaca, N.Y.[2], fits that of an adventive species.

Two sites of collection, the grounds of the Smithsonian Institution and the Cornell campus, are likely sources of earlier introductions of exotic plant material. In fact, a number of Palearctic mirids have been collected on the Cornell campus in recent years (Wheeler, 1979). Heidemann (1892) also noted that *B. puncticornis* (cited as *O. delicatus*) was restricted to a single European ash and that it was taken with the psyllid *Psyllopsis fraxinicola* (*Förster*). This psyllid, considered a European introduction (Hodkinson and White, 1979), according to L. O. Howard had been present for many years on European ash on the grounds of the U.S. Department of Agriculture (Felt, 1911). Since *P. fraxinicola* is known in Europe only from European ash, both the psyllid and the mirid may have been introduced with ash nursery stock.

Brachynotocoris puncticornis appears to have expanded its European distribution in recent years, again probably with the movement of plant material. This mirid was first recorded from Germany in 1931 (at Aschaffenburg), and in 1937 it appeared in great numbers on a single European ash in a city park at Mainz (Wagner, 1956).

With the addition of *B. puncticornis*, the list of Holarctic Miridae known from the northeastern U.S. stands at an estimated 53 species. As the largest family of Hemiptera-Heteroptera, the Miridae might be expected to contain the largest number of introduced species, but their actual representation is proportionately greater than for most of the other large families. Mirid oviposition habits may account for this high representation. Eggs that are in-

[2] And American Fork, Utah, assuming Kelton's (1979) synonymy is correct.

serted deep into plant stems not only are protected from desiccation but are not easily detected by inspectors examining nursery stock. Thus mirids move easily with long distance commerce in shipments of plant material.

Acknowledgments

We thank W. R. Dolling, British Museum (Natural History), for lending Palearctic material of *B. puncticornis*, and our colleague K. Valley for reading the manuscript.

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